

# PATENT SPECIFICATION

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## (54) TOY VEHICLES WITH SPRING SUSPENSIONS

(71) We, THE METTOY COMPANY LIMITED, a British Company of 14 Harlestone Road, Northampton NN5 7AF. England, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to toy vehicles fitted with spring suspensions, and in particular to a multi-axled, endless-track toy vehicle, such as a toy tank.

Various forms of spring suspension have been devised for toy vehicles, including springs in the form of metal rods or plates, or plastic fingers usually formed integrally with mouldings constituting chassis plates or interior details.

In accordance with the present invention there is provided a multi-axled, endless track toy vehicle including a body, the axles, which carry endless-track engaging wheels at opposite ends thereof, being parallel with each other and individually mounted for independent vertical movement relative to the body, and one or more resilient members each bearing downwardly on all the said axles.

In one of the preferred embodiments of the invention, the or each resilient member is a block of resilient foam material mounted within the body of the vehicle and bearing resiliently downwardly on the axles.

Preferably, two elongated blocks of foam are arranged to extend longitudinally of the vehicle, on either side of the longitudinal axis.

A strip of pliable material may be provided between the axles and the foam material to reduce the tendency of the axles to form permanent indentations in the foam.

In an alternative embodiment a single resilient member is provided and consists of

a spring frame in the form of a moulding of synthetic material having separate portions bearing downwardly on each axle.

Two embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:—

Figure 1 is an exploded perspective view of a toy tank embodying the invention;

Figure 2 is a transverse section showing the suspension of one axle of the tank;

Figure 3 is a longitudinal section through a part of the tank shown in Figure 1;

Figure 4 is a perspective view of a spring plate according to a second embodiment; and

Figure 5 is a perspective view of a chassis adapted for use with the spring frame shown in Figure 4.

Referring to Figures 1 to 3, the toy tank has a top or body portion 1 and a bottom or chassis plate 2, both die-cast moulded in synthetic material. The body 1 has a pair of downwardly extending pegs 3 for engagement in respective bosses 4 on the chassis plate to locate and secure the body to the chassis.

The chassis plate has parallel vertical side portions 5 formed with a corresponding series of recesses 6 which register, in the assembled vehicle, with recesses 7 in vertical side portions 8 of the body 1 to define vertically extending slots 9 for locating axles 10, each of which carries a pair of track wheels 11. The axles positioned in the slots extend parallel to each other and endless-track belts extend around the track wheels in usual fashion.

A pair of elongated blocks 12 of resilient foam material are secured adjacent the side portions 8 on the underside of the body 1 and extend longitudinally thereof either side of the longitudinal axis and of the pegs 3. The blocks 12 press down on the axles 10 to bias the latter to their

lowermost positions within the slots 9 formed by recesses 6 and 7.

With the tank thus assembled, resilient deformation of the foam blocks 12 permits the track wheels 11 of each axle 10 to undergo restricted vertical displacement, as allowed by the slots 9, independently of the other track wheel carried on that axle, as illustrated in Figure 2. Furthermore, the displacement of each axle is independent of the displacement of all the other axles due to the way in which the foam blocks 12 deform locally, as illustrated in Figure 3. When the wheel displacing force is removed, the resilient blocks 12 return the axles to their lowermost positions within the slots.

A strip of pliable material may be applied to the lower surface of each block 12, between the axles and the blocks, to assist in preventing the blocks becoming permanently indented as a result of vertical displacement of the axles from their lowermost positions.

In the embodiment shown in Figures 4 and 5, except for the differences described below, the body (not shown) and chassis are basically the same as those described with reference to Figure 1 and the same reference numerals have been used to indicate the features common to both embodiments.

The chassis 2 additionally has a series of four upwardly directed projections 15 spaced along its length for positioning a spring plate 16 thereon after the axles (not shown) have been located in the recesses and prior to assembling the body and chassis. The spring plate 16 is moulded from synthetic plastics material and is formed with a series of holes 17 for cooperation with the projections 15 on the chassis, and holes 18 to permit the body to be secured to the chassis by pegs and bosses as described above. The longitudinal sides of the spring plate 16 are formed with corresponding series of lateral projections 19 equal in number and spacing to the axles and having enlarged end portions 20 which press downwardly on the axles in the assembled vehicle.

Due to this construction of the spring plate the end of each axle is biased downwardly essentially independently of its opposite end and of the other axles, whereby independent vertical displacement of the

track wheels carried on the axles is permitted as in the Figure 1 embodiment.

It should be noted that the orientation of the spring plate is not critical since it is symmetrical about two planes and it may be inverted or longitudinally reversed relative to the chassis.

#### WHAT WE CLAIM IS:—

1. A multi-axled, endless track toy vehicle including a body, the axles, which carry endless-track engaging wheels at opposite ends thereof, being parallel with each other and individually mounted for independent vertical movement relative to the body, and one or more resilient members each bearing downwardly on all the said axles.

2. A toy vehicle according to claim 1 wherein the or each resilient member is a block of foam material.

3. A toy vehicle according to claim 2 wherein two elongated blocks of foam material extend longitudinally of the vehicle on either side of its longitudinal axis.

4. A toy vehicle according to claim 2 or 3 wherein a strip of pliable material is disposed between each block of foam and the axles.

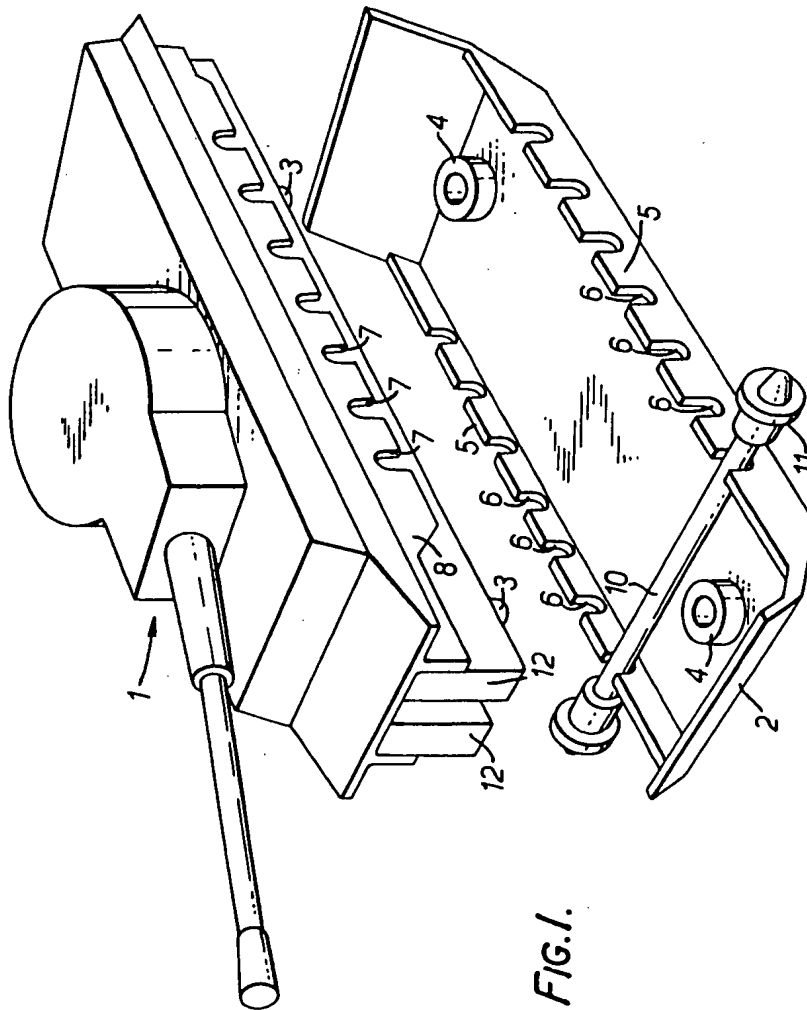
5. A toy vehicle according to claim 1 wherein a single resilient member is provided in the form of a spring plate moulded from synthetic plastics material and having separate resilient portions for bearing downwardly on the respective axles.

6. A toy vehicle according to claim 5 wherein the spring plate has a respective pair of opposed lateral projections for pressing downwardly on each axle.

7. A toy vehicle according to any of claims 1 to 6 wherein the axles extend through vertical slots in the opposite sides of the vehicle body, the or each resilient member being located within the vehicle body to urge the axles resiliently to their lowermost positions in the slots.

8. A toy vehicle substantially as herein described with reference to Figures 1 to 3 or Figures 4 and 5 of the accompanying drawings.

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COMPLETE SPECIFICATION

3 SHEETS

This drawing is a reproduction of  
the Original on a reduced scale  
Sheet 2

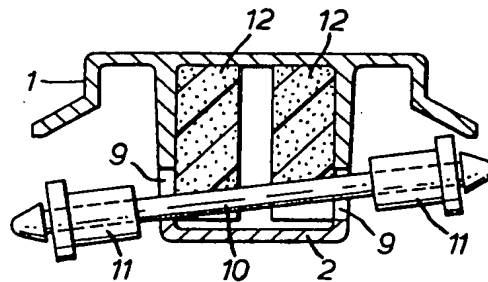


FIG. 2.

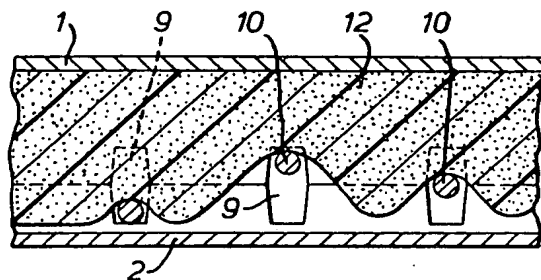
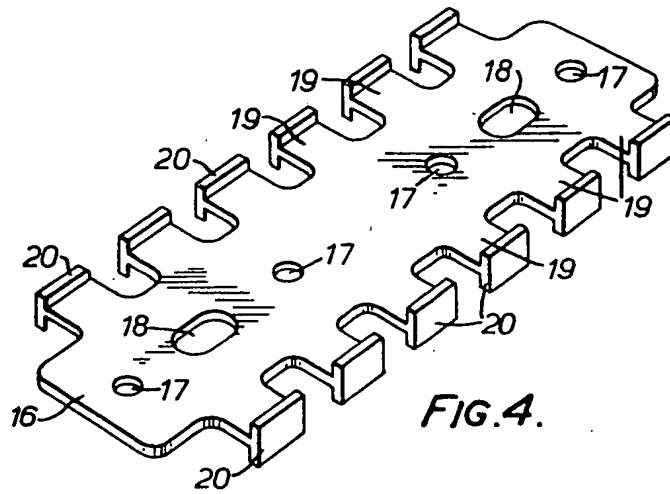
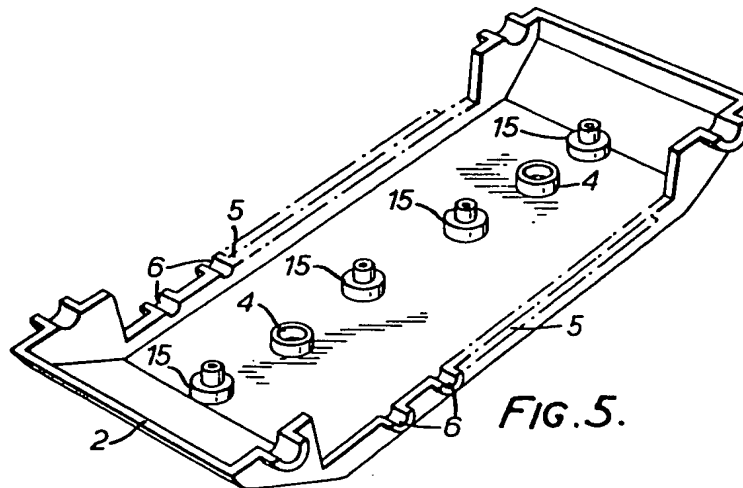


FIG. 3.



**FIG. 4.**



**FIG. 5.**